



# STREETSCAPE DESIGN STANDARDS NASSAU STREET

• PRINCETON, NEW JERSEY •

FALL 2016

SPONSORED BY THE MUNICIPALITY OF PRINCETON  
IN PARTNERSHIP WITH PRINCETON UNIVERSITY  
& PRINCETON MERCHANTS ASSOCIATION



PRINCETON  
UNIVERSITY



# TABLE OF CONTENTS

## SECTION I : **INTRODUCTION**

Introduction.....	4
Sidewalk Typology & Zones .....	5

## SECTION II: **STREETSCAPE DESIGN ELEMENTS**

Paving Design & Materials .....	9
Crosswalk Markings & Materials .....	10
Street Lighting .....	11
Traffic Signals .....	12
Traffic & Pedestrian Signage .....	13
Street Trees .....	14
Landscaping & Planters .....	15
Landfill & Recycling Receptacles.....	16
Bicycle Parking .....	17
Newspaper Racks.....	19
Parking Pay Stations.....	20
Public Benches.....	21
Outdoor Dining .....	22
Sandwich Board Signs .....	24
Bus Shelters.....	25

## SECTION III: **SPECIAL CONDITIONS**

Landscape Edges.....	27
Alley Crossings.....	28
Plaza Edges .....	29

---

## **SECTION I: INTRODUCTION**

---

# SECTION I : INTRODUCTION

## INTRODUCTION

This Nassau Street Streetscape Design Standards establish a standardized design vocabulary and materials palette with the goal of enhancing the appearance, safety and pedestrian-friendly experience of the business district along Nassau Street between Bayard Lane and Moore Street.

These Streetscape Design Standards establish an overall design vocabulary and palette of materials for a range of identified streetscape design elements that recognize the cultural and historical significance of Nassau Street. This allows for the upgrade and replacement of worn and unsound streetscape elements, materials and surfaces as well as the introduction of new elements that reflect changes in infrastructure, technology and the community's needs.

## STUDY AREA

The Study Area includes the business district frontage along Nassau Street from Bayard Lane to Moore Street, but also takes into account the visual and experiential relationship between the Nassau Street business district and the immediately-adjacent areas of Princeton University and Palmer Square. As such, design standards within this document are designed to be compatible with and may be applied to the Princeton University streetscape fronting Nassau Street.



Study Area Map

## PROJECT GOALS

- Establish a palette of materials and design vocabulary for a range of identified streetscape elements that recognize the cultural and historical significance of Nassau Street.
- Enhance the appearance, safety and pedestrian-friendly experience of the Business District along Nassau Street.
- Recognize relationship between the business district and the immediately adjacent areas of Princeton University and Palmer Square.

# SIDEWALK TYPOLOGY & ZONES



The map above identifies sidewalk typologies for sidewalks 16 feet or greater and less than 16 feet along Nassau Street.

Sidewalk width has significant impact on the amenities and types of activities that can occur within the pedestrian realm of the streetscape.

Sidewalks along Nassau Street in the Central Business District can generally be divided into two (2) sidewalk typologies based on their overall width:

**16 feet or greater:**

These sidewalks generally handle high levels of activity and pedestrian amenities and are the widest sidewalk sections of the Princeton's Central Business District.

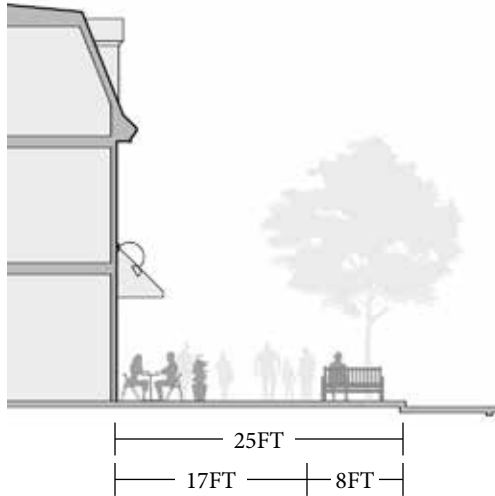
**Less than 16 feet:**

These sidewalks are the narrower of the Princeton's Central Business District. They generally handle the same high levels of pedestrian traffic, but offer a comfortable, smaller pedestrian realm.

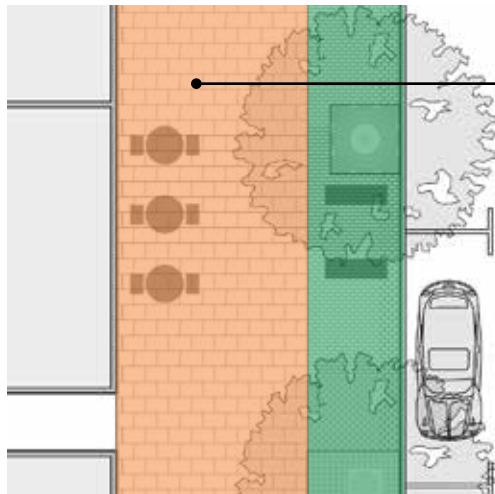


# SIDEWALK TYPOLOGY & ZONES

16 feet or greater



Existing sidewalk zone conditions along Nassau Street for sidewalks 16 feet or greater.



Throughway Zones in sidewalks 16 feet or greater increase the opportunity for amenities, making the streetscape a more useful and attractive public space.

- Furnishing Zone
- Throughway Zone

Sidewalk type: 16 feet or greater.

A successful sidewalk engages and enables active public space and accessible pedestrian travel. Amenities such as outdoor dining, signage, lighting, street trees and landscaping work to activate the streets socially and economically. These amenities can be organized and into two (2) zones within the sidewalk to ensure safe and accessible travel and activation of street life. The two (2) zones are described as follows:

**Throughway Zone:** The portion of the sidewalk that is the primary pedestrian pathway along the street. Minimum space required for the Throughway Zone is six (6) feet. For sidewalks 16 feet or greater, the Throughway Zone can accommodate outdoor dining within the Frontage Zone, which is the portion of the sidewalk immediately adjacent to the building.

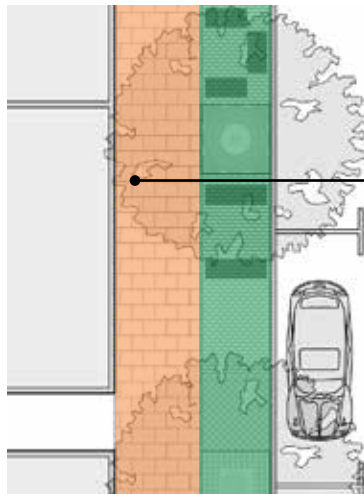
**Furnishing Zone:** The portion of the sidewalk used for street furniture, outdoor dining, signage, lighting and landscaping between the curb and Throughway Zone. The minimum space required for the Furnishing Zone is eight (8) feet.

# SIDEWALK TYPOLOGY & ZONES



Less than 16 feet



Existing sidewalk zone conditions along Nassau Street for sidewalks less than 16 feet.



Throughway Zones along Nassau Street should have a minimum of (6) feet in width of unobstructed pathway to allow for safe pedestrian movement.

-  Furnishing Zone
-  Throughway Zone

Sidewalk type: Less than 16 feet.

A successful sidewalk engages and enables active public space and accessible pedestrian travel. Amenities such as outdoor dining, signage, lighting, street trees and landscaping work to activate the streets socially and economically. These amenities can be organized and into two (2) zones within the sidewalk to ensure safe and accessible travel and activation of street life. The two (2) zones are described as follows:

**Throughway Zone:** The portion of the sidewalk that is the primary pedestrian pathway along the street. Minimum space required for the Throughway Zone is six (6) feet.

**Furnishing Zone:** The portion of the sidewalk used for street furniture, outdoor dining, signage, lighting and landscaping between the curb and Throughway Zone. The Furnishing Zone should generally be six (6) feet wide on block faces that have sidewalks less than 16 feet, as measured from the edge of curb. This zone may be expanded to eight (8) feet based on site conditions that allow for an appropriate transition point, such as a plaza or tree well.

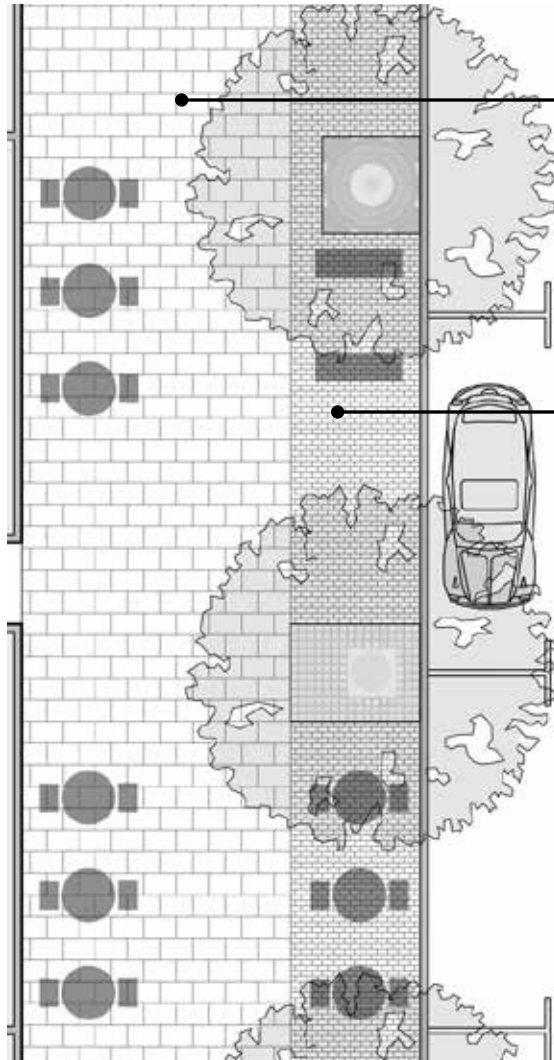
---

## **SECTION II: STREETSCAPE DESIGN ELEMENTS**

---



# PAVING DESIGN & MATERIALS



## **Brick-sized Paver (Furnishing Zone)**

As manufactured by Whitacre Greer, Belden Brick, or equal. Units shall be made from compressed shale and/or clay, shall conform to Brick Industry Association and ASTM standards for SX compressed clay pavers, and have a minimum compressive strength of 8,000 psi.



## **London Paver (Throughway Zone)**

As manufactured by Hanover Architectural Products, Unilock, or equal. Units shall be made of Portland Cement, fine and coarse aggregates, and coloring. Units shall be steam cured and obtain a compressive strength of 8,500psi. Thickness = 2". Size of paver should be approximately 16" by 24".

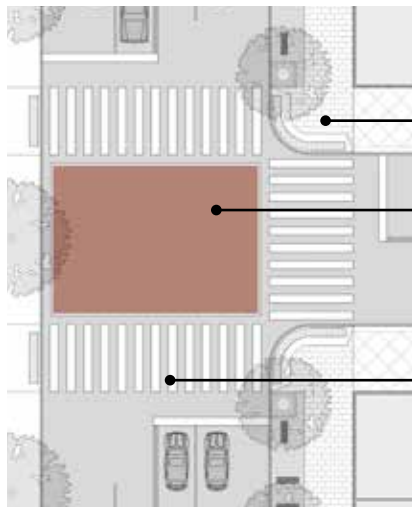
The paving and design of Princeton's streetscape should reflect a high level of quality of care as it serves a high volume of local residents and visiting shoppers and tourists. Preferred design and materials of sidewalk paving is as follows:

- London Pavers in a cool gray color range are preferred in the Throughway Zone.
- Brick-sized paving in the Furnishing Zone should be color compatible with the Throughway Zone paving to visually separate and highlight the amenities in the Furnishing Zone.
- Paving should be designed, installed, and maintained to be smooth and level and should not pose tripping hazards.
- Surfaces should not have abrupt changes in level of more than 1/4 inch.
- Surface materials should have high durability, slip-resistance, and compressive strength.
- Surface materials should have low maintenance requirements.

# CROSSWALK MARKINGS & MATERIALS



Simulated view of extended ladder crosswalk and colored pavement treatment at Witherspoon and Nassau Street.



London Paver extended to intersection/curb edge with concrete pedestrian ramps

Optional colored pavement surface treatment at key intersections along Nassau Street:

- Witherspoon Street
- Washington Street
- University Place

Ladder Crosswalk

## Crosswalk and Materials:

- Provide Ladder-Style pedestrian crosswalk markings at all intersections.
- Provide design treatments that slow vehicles and maximize pedestrian visibility.
- Accessible pedestrian facilities such as curb ramps are to be aligned with pedestrian traffic flow.
- Cast iron tactile warning strips and accessible pedestrian signals should be provided.

# STREET LIGHTING



Pedestrian scale light



Pedestrian lighting on traffic signal posts



Roadway lighting with optional banner

## Street Lighting:

- Preferred pedestrian-scale lighting lamppost is the existing historic stylized Victorian acorn fixture with of a decorative cast aluminum fitter, cast ballast housing assembly and a high efficiency polycarbonate or acrylic prismatic acorn globe.
- Any future LED retrofits or replacements of these fixtures should include:
  - Dark sky friendly lighting fixtures that are full cutoff, directing all of its light downward, thereby eliminating excessive light level and reducing light pollution.
  - LED in a warm light color temperature range of 2700K to 3000K.
- Where possible, street lighting at crosswalks should be provided in order to increase pedestrian visibility from motor vehicles in an effort to make it safer.
- Where possible, street lighting should be combined with traffic light to reduce the quantity of poles on the sidewalk.
- Preferred roadway lighting fixture is the existing State highway fixture.
- Consider solar panels on south-facing fixtures.



# TRAFFIC SIGNALS



New black traffic signal pole & arms being installed on Washington Street / Vandeventer Street and Nassau Street.



Utilities and electrical boxes should have a black finish consistent with traffic signal.



Street signs on traffic signals should have a brown background with white lettering.

## Traffic Signal Pole & Mast Arms:

- Traffic signal poles, traffic lights and mast arms should have a black finish that is compatible with colors of the street amenities along Nassau Street.
- Street name signs hanging from traffic signal mast arms should have a brown background with white lettering within locally-designated historic districts. Alternatively, signage may utilize the standard green color per MUTCD standards.
- All signage and street name fonts shall conform to MUTCD standards.
- Electrical boxes and utilities associated with traffic signals should be painted a black finish consistent with the pole and mast arms of the traffic signal.
- Consider solar panels on south-facing fixtures.

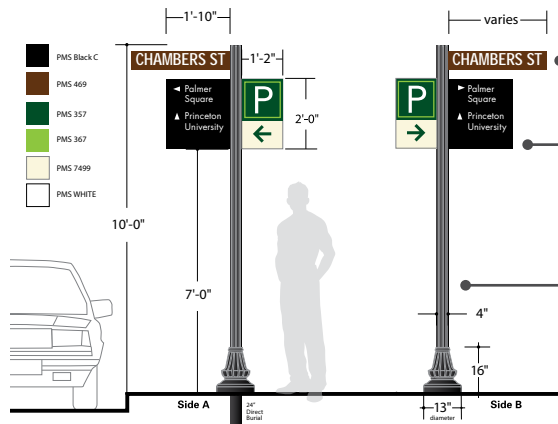
# TRAFFIC & PEDESTRIAN SIGNAGE



Existing view of multiple street and parking signs creating visual clutter.



Simulated view of a fluted street sign with wayfinding and parking sign attached to one pole.

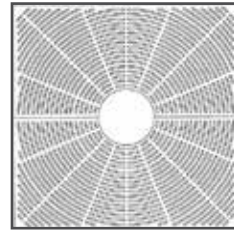
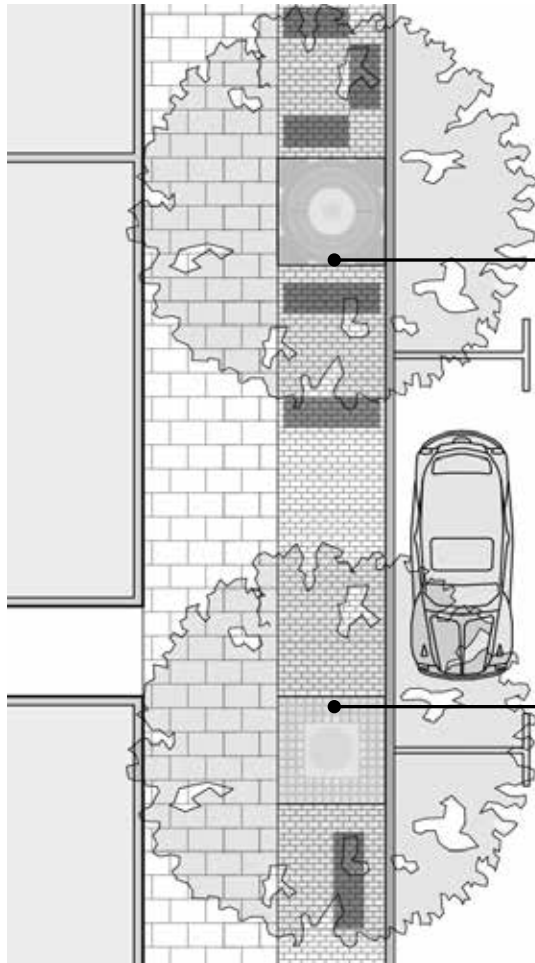


- 6" tall street name signs with 4" cap height letters on brown backer, set into TSB203 sign frame ([www.speciallite.com](http://www.speciallite.com)).
- 2" cap height white pedestrian directional letters/symbols applied to black backer to match existing Princeton University signage. Parking directional signage to match existing Palmer Square parking directional signage.
- 4" diameter x 12' tall (bottom 2' buried to create 10' visual height) O/D fluted post finished with a black premium quality thermoset polyester powder coat for a durable finish. WRB11 decorative base and TSB60 post topper to match finish of post. ([www.speciallite.com](http://www.speciallite.com))

## Traffic & Pedestrian Signage:

- All posts, bases, caps and sign backers/frames to be finished in matching black to create a clean and uniform look.
- When possible, multiple signs should be aligned on one pole to avoid visual clutter on corners.
- MUTCD/local code regulations should be followed regarding mounting heights and sizes of all signs, including street name fonts.
- Overuse of enforcement signage dilutes the effectiveness and clutters the streetscape and should be discouraged.
- Pedestrian scale signage should be designed to complement the overall streetscape design, but be visible enough to catch the attention of a passerby.
- When signs are mounted to black streetscape furniture and are single-sided, the backs of the signs and mounting hardware should be painted black to camouflage any visual distractions.

# STREET TREES



Traditional 6' by 6' cast iron grate placed over tree well. Nominal 3/4" thick depending on material. Rings at center of grate are to be cut as tree grows to allow for growth without damage to tree.



When cobblestones define a tree well they should be placed outside the root ball of the tree and be separated by the Throughway paving with a metal edge. At-grade planting may be included in the tree well area.

## Street Trees:

- The selection of species of trees should provide for biodiversity, be drought- and salt-tolerant, and maintain a broad canopy of shade for pedestrians.
- Street trees should be planted in the furnishing zone and be placed in a continuous line with consistent spacing to establish a visual rhythm and canopy along the street.

## Tree Wells:

- 6' by 6' traditional, cast-iron tree grates that allow for tree growth are preferred for tree wells in the Furnishing Zone along Nassau Street.
- For existing trees that exceed the dimensional requirements of a tree grate, 4" gray cobblestones or Belgium blocks are the preferred material to define the tree well.
- In narrow sidewalks tree grates may be counted toward the minimum clear path of travel of the Throughway Zone.



# AT-GRADE LANDSCAPING, HANGING PLANTERS & LANDSCAPE CONTAINERS



Planters as buffers/visual screens



Planters at base of building



Hanging planter on lamppost



Simulated at-grade drought-tolerant landscaping and movable planters as a buffer for outdoor dining.

## Landscaping:

- At-grade landscaping within the Furnishing Zone and any foundation planting along building edges should use native drought- and salt-tolerant species adaptable to the urban environment. Drought-tolerant species have many benefits including low or no irrigation needs once established, increased soil permeability, storm water infiltration, water quality improvement, enhanced rainwater management, mitigate flooding, prevent erosion and increased wildlife habitat.
- Species selection should be coordinated with the Rutgers New Jersey Agricultural Experiment Station (NJAES) and utilize Environmental Protection Agency (EPA) best management practices.
- Plant material with thorns are prohibited in any zone within the sidewalk.

## Planters:

- Planter baskets should be mounted approximately 4.5 feet above grade on all pedestrian-scale lampposts. Use of drought tolerant perennials such as succulents are highly encouraged.
- Movable planters are encouraged to be used as a visual screen or buffer alongside any outdoor dining or café seating.

# LANDFILL & RECYCLING RECEPTACLES



Combination Receptacles - The DuMor 435 is a side-loaded combination landfill and 2-stream recycling receptacle. This model is constructed of 3/8" thick galvanized steel with polyester powder coat finish, includes (1) 32-gallon and two (2) 20-gallon interior liners, and measures 44" high by 50" wide by 28" deep.



Examples of existing receptacles manufactured by Belson; (L) combined receptacle; (R) single receptacle found at Princeton University.



Example of side-access for servicing combination landfill & recycling receptacles.

## Landfill & Recycling Receptacles:

- Landfill and recycling receptacles should be a combination type, located in a consistent manner, so as to be easily recognizable, and spaced to be reasonably convenient to users.
- Landfill and recycling receptacles should be side-loaded with shape-specific recycle openings, so as to encourage appropriate use and to discourage the collection of refuse or debris on the top of the receptacle.
- Receptacles should be constructed of 3/8" (minimum) thick galvanized steel with a polyester powder coating for durability and graffiti resistance.
- Receptacles should be black with color-coded shape-specific recycling access, so appropriate use is clearly understandable.
- Receptacle should be able to open from the side to allow easy access for removal of garbage bags.
- Municipality may further explore adding composting bins alongside combination receptacles.

# BICYCLE PARKING



Simulated view of Nassau Street bike corral with planters & surface treatment.



Example of bike corral with planters & pavement markings in New York City.

## Bicycle Corrals:

- Sidewalk bicycle parking should be consolidated to bicycle corrals within the roadway of Nassau Street.
- Bicycle corrals for parking of four (4) to eight (8) bikes per 5' section should be placed on-street next to the curb and prioritized in "no parking areas" where sufficient demand exists for bicycle parking.
- Based on parking demand, additional bicycle corral locations should be considered on Nassau Street and side streets.
- Bicycle corrals should be delineated with pavement markings/color, protected through the use of flexible traffic delineator posts/bollards, and beautified through the placement of planters.

# BICYCLE PARKING



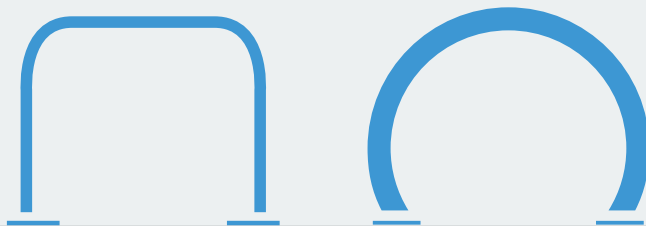
## Bicycle Parking:

- Preferred bicycle rack styles within the Furnishing Zone include:
  - Inverted U Racks with two points of ground contact
  - Post and Ring with one point of ground contact
  - Wheelwell Secure with bike well for longer-term parking
- All bicycle racks should be made of a highly durable steel tubing with a protective powder coated or seal guarded outer coating in a black finish.



## Recommended Bike Rack Designs

### Preferred Design



#### Inverted U

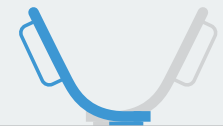
Common style appropriate for many uses; two points of ground contact. Can be installed in series on rails to create a free-standing parking area in variable quantities. Available in many variations.

### Other Acceptable Designs



#### Post and Ring

Common style appropriate for many uses; one point of ground contact. Compared to inverted-U racks, these are less prone to unintended perpendicular parking. Products exist for converting unused parking meter posts.



#### Wheelwell Secure

Includes an element that cradles one wheel. Design and performance vary by manufacturer; typically contains bikes well, which is desirable for long-term parking and in large-scale installations (e.g. campus); accommodates fewer bicycle types and attachments than the two styles above.

Courtesy of the Princeton Bicycle Master Plan, draft 2016



# NEWSPAPER RACKS



Manufactured from heavy 14-20 gauge powder coated steel. Available in multiple combinations of units to accommodate both tabloid and broad sheet formats. Boxes can accommodate either paid and free newspapers. Available in size from 1-box to 8-box. Multiple units can be placed together.

---

## Newspaper Racks:

- Newspaper racks should be consolidated into a single integral cabinet where possible along Nassau Street.
- The single integral cabinet should have an attractive, clean, and simple design that complements the design and color of other street furniture.
- Newspaper racks should be placed no closer than four (4) feet from adjacent street signs or bike racks.
- No newspaper rack should be placed within six (6) feet of the curb for the length of any bus zone.
- A maximum of five (5) free-standing news racks may be placed in a continuous row. No more than two (2) fixed pedestal mount news racks may be placed within 10 feet of each other.

# PARKING PAY STATIONS



Example above is a Luke II Multi-space Pay Station from T2systems and illustrates preferred features of a multi-space meter.

## Parking Pay Stations:

Parking meters along Nassau Street should be replaced with multi-space meters as a parking management tool. Consolidating parking meters through multi-space meters reduces the number of poles in the sidewalk and allows for the installation of additional street amenities in the Furnishing Zone.

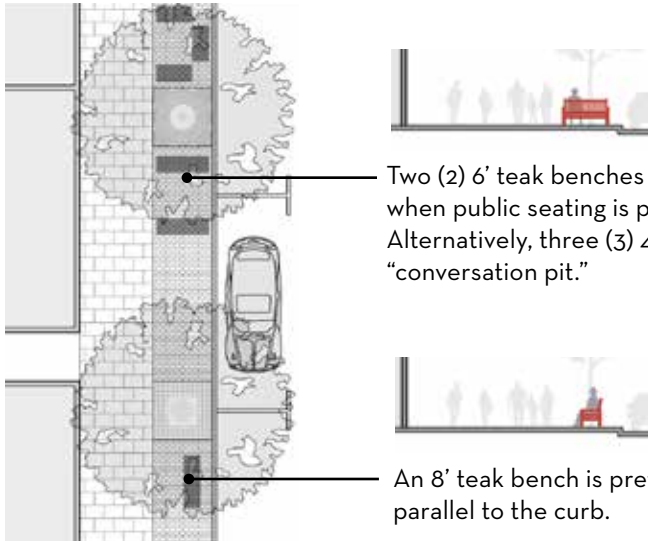
- Multi-space meters should replace pole-mounted parking meters in the Furnishings Zone.
- Poles from individual parking meters should be removed since multi-space meters cannot be mounted to them. In the meantime, abandoned and unused poles may be adapted for additional bike parking as may be necessary.
- Multi-space meters should be placed every eight (8) to 10 parking spaces.
- Signage directing patrons to multi-space meters should be placed every five (5) parking spaces.



# PUBLIC BENCHES



Public seating creates a comfortable, usable, and active environment where people can socialize.



Two (2) 6' teak benches grouped together are preferred when public seating is placed perpendicular to the curb. Alternatively, three (3) 4' teak benches can be grouped in a "conversation pit."

An 8' teak bench is preferred when public seating is placed parallel to the curb.

## Public Benches:

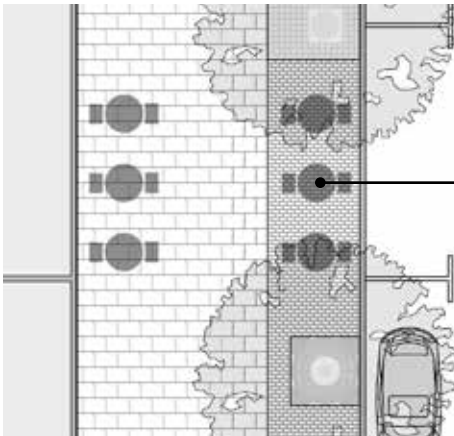
- Public benches may be placed in the Furnishing Zone parallel or grouped perpendicular to the curb.
- The bench standard is a teak bench manufactured from sustainably harvested Indonesian Teak. Heavy duty 3" legs and mortise and tenon joinery. Length varies from four (4) feet to eight (8) feet.
- Seating should be located under trees where possible to provide shade.
- An 8' teak bench is preferred when public seating is placed parallel to the curb. Bench should face towards the buildings and be located in the middle of the Furnishing Zone.
- Two (2) 6' or three (3) 4' teak benches grouped together are preferred when public seating is placed perpendicular to the curb. Benches should face each other so people may socialize and be centered in the middle of the Furnishing Zone.

# OUTDOOR DINING

16 feet or greater



Simulated view of outdoor café seating in both the Furnishing and Throughway Zone, maintain more than six (6) feet of clear area for pedestrians.



Tables and chairs shall not interfere with pedestrian flow along the Throughway Zone. A minimum of six (6) feet of clearance shall be provided within the Throughway Zone.

## Outdoor Dining & Café Seating:

- Private outdoor café and restaurant seating is encouraged in either the Furnishing Zone or immediately adjacent to the building in the sidewalks 16 feet or greater.
- Tables, chairs and bench seating should only be placed in front of the place of business they serve and are subject to permits and/or licensure.
- Access to parked vehicles, loading zones, curb ramps, driveways, building access and fire escapes may not be obstructed with tables and chairs.

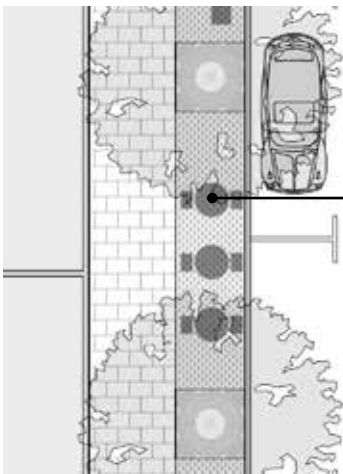


# OUTDOOR DINING

Less than 16 feet



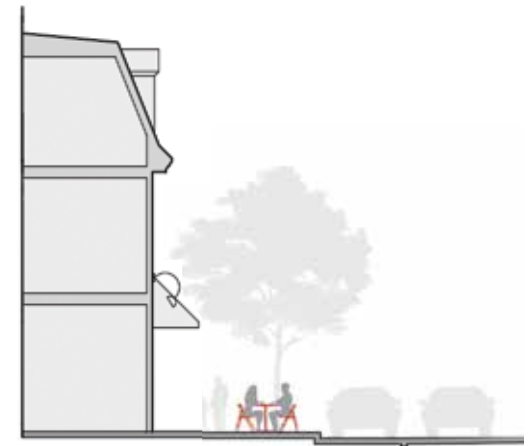
Simulation of café seating along the furnishing zone along Nassau Street.



For sidewalks less than 16 feet, outdoor café seating and chairs are encouraged to be located curbside in the Furnishing Zone. Locating tables and chairs as such allows for more room in the Throughway Zone. A minimum of six (6) feet of clearance shall be provided within the Throughway Zone.

## Outdoor Dining & Café Seating:

- Private outdoor café and restaurant seating may be in the Throughway Zone on sidewalks less than 16 feet wide, but is encouraged to be located curbside in the Furnishing Zone to maximize Throughway clearance.
- Tables, chairs and bench seating should only be placed in front of the place of business they serve and are subject to permits and/or licensure.
- Access to parked vehicles, loading zones, curb ramps, and driveways may not be obstructed with tables and chairs.





# SANDWICH BOARD SIGNS

## Preferred Sandwich Board Styles:



Contemporary Style



Traditional Style

## Sandwich Board Signs:

- Sandwich boards should be composed of an A-frame structure.
- Sandwich board signs may be placed alongside the building or in the Furnishing Zone, allowing for the full Throughway Zone to remain clear for the safe passage of pedestrians.
- Two (2) preferred styles for sandwich boards include:
  - Contemporary Style: Sign color is seamlessly integrated with structure of sandwich board.
  - Traditional Style: The content of the sign is contained within a raised frame.
- The following types are discouraged:
  - T-frame structures, which pose a potential tripping hazard.
  - Plastic molded sandwich boards.

# BUS SHELTERS



Simulated view of Brasco Bayline Series enhanced bus shelter with green roof and solar panels at Palmer Square with optional red pavement.

## Bus Shelters:

- A recently approved “flagship” Brasco Bayline series bus shelter with a living green roof and solar panels will be placed at Palmer Square, which is the highest-volume bus stop in Princeton.
- Additional installation of Brasco Bayline series bus shelter models are subject to funding and ridership demand needed to justify the special enhancements.
- Basic bus shelter models provided by NJ TRANSIT shall be enhanced with solar panels and the Princeton Logo located within the sides of the barrel roof of the standard Princeton black “Fair Lawn style” Handi-hut bus shelters.

---

## **SECTION III: SPECIAL CONDITIONS**

---



# LANDSCAPE EDGES



Simulated view of enhanced landscaping and seating in the Furnishing Zone along a landscape edge condition.



The Landscape Edge condition occurs at four (4) locations along study area on Nassau Street. These four (4) locations are in front of Palmer House and Palmer Square, as well as, Nassau Christian Center and Princeton United Methodist Church.

## Landscape Edges:

- Areas with semi-private landscaped edges with no adjacent commercial activity along Nassau Street should have enhanced landscaping and seating amenities within the Furnishing Zone.
- Such enhanced amenities might include:
  - Increased planting beds of at-grade drought tolerant plants with additional public seating
  - Benches
  - Permeable paving
  - Rain gardens/bioretenion basins

# ALLEY CROSSINGS



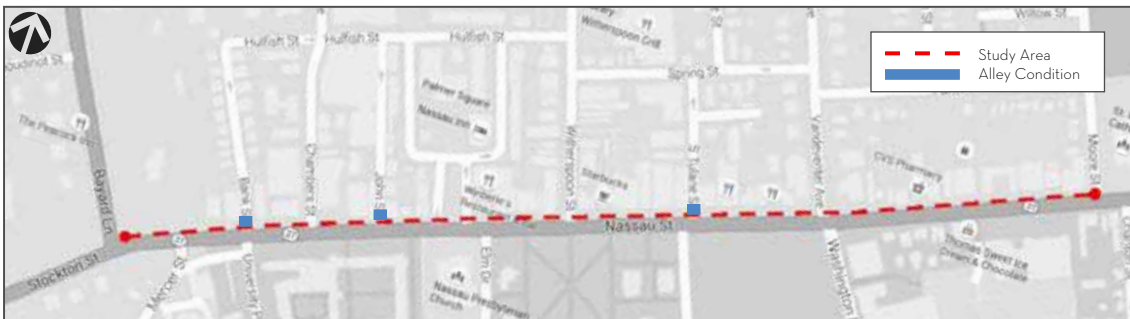
Simulated view of raised pedestrian crossing over cobblestone alley.



Large 5" gray smooth-faced cobblestones ramp to raised pedestrian crossing over alley entrance.

## Alley Crossings:

- Alleys should incorporate raised crossings continuing the Throughway Zone paving across the alley entrance.
- Cobblestone paving should extend across the entire cartway on both sides of the Throughway Zone.
- Cobblestone paving should be smooth-faced to accommodate bicyclists.
- Cast iron tactile warning strips the length of the Throughway Zone should delineate and identify the raised crossing for visually impaired.



Alley Crossings occur at three (3) locations along study area on Nassau Street. These three (3) locations are Bank Street, John Street Alley, and South Tulane Street.

# PLAZA EDGES



Simulated above is a continuous paver treatment of London Pavers from Palmer Square extend to the length of the sidewalk.



The Plaza edge condition occurs at three (3) locations along study area on Nassau Street. These three (3) locations are near Palmer Square, the Princeton Garden Theatre and the plaza in front of Santander Bank.

## Plaza Edges:

- Plazas are permitted to use special paving and have the option to extend that paving in a continuous treatment across the sidewalk zone.
- Plaza paving should have a distinct transition and color difference between the standard paving of the sidewalk.







# APPENDIX




## STREETSCAPE DESIGN STANDARDS NASSAU STREET





• PRINCETON, NEW JERSEY •


# Design Elements - Sidewalk Paving Design And Materials

Material/Design Element	Manufacturer & Description	Approximate Cost	Durability & Maintenance	Implementation Range
Concrete	4,500 psi concrete containing a blend of Portland Cement, admixtures, and ¾" aggregate. Scored at 48" either perpendicular or at a 45 degree angle to path of travel. Color to be French Gray. Materials and installation shall conform to ACI and ANSI standards.	\$10.00/SF – 90 degree. \$14.00/SF – 45 degree	20 – 30 years. Factors affecting durability include cutting and opening of sidewalks for utility repairs and heaving of surface due to tree roots and freeze thaw.	Immediate
Pavers - London 	As manufactured by Hanover Architectural Products, Unilock, or equal. Units shall be made of Portland Cement, fine and coarse aggregates, and coloring. Units shall be steam cured and obtain a compressive strength of 8,500 psi. Thickness = 2". Sizes available include combinations of 8", 12", 16", 24", 36", 48".	\$19.00/SF	40 years. Factors affecting durability include cutting and opening of sidewalks for utility repairs and heaving of surface due to tree roots and freeze thaw.	Immediate
Pavers - Brick 	As manufactured Whitacre Greer, Belden Brick, Glen Gery, or equal. Units shall be made from compressed shale and/or clay, shall conform to Brick Industry Association and ASTM standards for SX compressed clay pavers, and have a minimum compressive strength of 8,000 psi.	\$21.00/SF	40 years. Factors affecting durability include cutting and opening of sidewalks for utility repairs and heaving of surface due to tree roots and freeze thaw.	Immediate
Belgian Block 	Natural granite 'setts' installed over sand, base rock and compacted earth subbase. For furniture zone and tree well areas only.	\$23.00/SF	40 years. Factors affecting durability include cutting and opening of sidewalks for utility repairs and heaving of surface due to tree roots and freeze thaw.	Immediate
Stone Dust 	Material shall be composed of dark gray crushed granite, argillite, gneiss, trap rock, or similar. Material shall be installed over a compacted base at bicycle and seating areas and shall be loose where used as a surround or stone mulch for tree wells.	\$2.00/SF	20 – 30 years. Factors affecting durability include cutting and opening of sidewalks for utility repairs and heaving of surface due to tree roots and freeze thaw.	Immediate

 = Green





# Design Elements - Tree Well Treatments


Material/Design Element	Manufacturer & Description	Approximate Cost	Durability & Maintenance	Implementation Range
Crushed red stone (Existing) 	#57 – 3/4" crushed red stone over earth. Material shall be installed over bare earth and weed barrier where used as a stone mulch for tree wells.	\$5.00/CF including ground prep and weed control fabric. Cost does not include tree or subsurface preparation.	Medium care required including some weed control, replacing stone.	As needed, depending upon size of tree and well.
Stone dust/Stone Mulch (Existing) 	Material shall be composed of dark gray crushed granite, argillite, gneiss, trap rock, or similar. Material shall be installed over bare earth and weed barrier where used as a stone mulch for tree wells.	\$4.50/CF including ground prep and weed control fabric. Cost does not include tree or subsurface preparation.	Medium care required including some weed control, replacing stone.	As needed, depending upon size of tree and well.
Belgian Block Stone with Stone Mulch (Existing) 	Belgian block setts surrounding tree well. Tree well may have stone mulch as described above or organic mulch. Block to be installed over sand, base rock and compacted earth subbase.	\$18.00/SF including cost of mulch and weed control fabric mulch.	Care will be similar to that for stone dust or red stone mulch. Repair to area may require replacing subbase.	As needed, depending upon size of tree and well.
Tree Grate – Cast Iron 	IronSmith - Cast iron tree grate placed over tree well. Nominal 3/4" thick depending on material. 1/4" slot openings. Rings at center of grate can be cut as tree grows to allow for growth without damage to tree. Grates attached to channels fastened to sidewalk material.	Varies depending upon material / complexity. Base price for a cast iron grate ranges from \$800 to \$1,450 varying on size and detail.	Care will be similar to that for stone dust or red stone mulch. Repair to area may require replacing subbase.	Design and sizes need to be designed and chosen during installation of sidewalk.

 = Green







# Design Elements - Trash And Recycling Containers

Material/Design Element	Manufacturer & Description	Approximate Cost	Durability & Maintenance	Implementation Range
Individual containers (Existing – PU) 	Belson CBTR – Similar to existing containers at Princeton University. Available in 32, 34, 36, 38, and 42 Gallon. Removable liner with lockable door. Powder coated 24 gauge steel frame and 14 gauge lid.	\$1,140.00/Ea.	All products by Belson include a 1 year manufacturer's warranty.	As needed.
Combined receptacle – Existing 	Belson SFT34X2D – Similar to existing containers on Nassau Street. Available in dual 34 Gallon configuration. Removable interior liner with lockable door. Powder 24 gauge powder coated steel frame and 14 gauge lid.	\$2,200.00/Ea.	All products by Belson include a 1 year manufacturer's warranty.	As needed.
Shared container - alternate 	Forms + Surfaces - Urban Renaissance receptacle manufactured in 36 and 45 gallon configurations. 40 inches high x 26 inch diameter. Stainless steel with powder coat finish. High recycled content. Hinged lockable access door with internal liner.	\$1,500.00/Ea.	All products by Forms + Surfaces include a 1 year manufacturer's warranty.	As needed.
Shared Container – alternate, side opening 	DuMor 435 combination trash and recycling container. Interior liners of 32 gal and (2) 20 gallon. Constructed of 3/8" thick galvanized steel with polyester powder coat. 44 inches high x 50 inches wide x 28 inches deep.	\$2,800.00/Ea.	1 year warranty.	As needed.


 = Green


# Design Elements - Bicycle Racks

Material/Design Element	Manufacturer & Description	Approximate Cost	Durability & Maintenance	Implementation Range
Hoop Rack (Existing) 	Manufactured from 1.5" Schedule 40 Steel tubing and available in a number of finishes including Galvanized, Stainless Steel, Powder Coat, and Thermoplastic over Galvanized. Available in surface mount or in-ground mounting as well as rail mount for bike corrals. Can be customized with city's logo in field.	\$100.00 – Powder Coated \$435.00 – Rail Mounted \$555.00 – Rail mounted with Thermoplastic Finish over galvanized.	Units are warranted for a period of one year from the date of delivery.	As needed
Rolling Rack (Existing) 	Manufactured from 2" Schedule 40 Steel tubing and available in a number of finishes including Galvanized, Stainless Steel, Powder Coat, and Thermoplastic over Galvanized. Provides multiple anchoring opportunities and is available with rail mount.	\$306.00 – Powder Coated \$368.00 – Thermoplastic over galvanized	Units are warranted for a period of one year from the date of delivery.	As needed
Post and Ring 	Manufactured from 2" and 1.5" Schedule 40 Steel tubing and available in a number of finishes including Galvanized, Stainless Steel, Powder Coat, and Thermoplastic over Galvanized. Available with logo in field. Available as surface or in ground mount.	\$131.00 – Powder Coated \$176.00 – Thermoplastic over galvanization Additional charge varies for logo based on quantity and design.	Units are warranted for a period of one year from the date of delivery.	As needed
Wheel Well Secure	Belson – Sentry Bike Storage. Surface Mount, black powder coated, 1-1/2" Square Steel Tubing with 3/16" Thick Wall and 3/4" O.D. Steel Locking Bars	\$149.00 – Powder Coated	Units are warranted for a period of one year from the date of delivery.	As needed
Wheel Well Secure 5-bike Rack	Belson – Sentry Bike Storage. 5-bike rail mount rack Surface Mount, black powder coated, 1-1/2" Square Steel Tubing with 3/16" Thick Wall and 3/4" O.D. Steel Locking Bars	\$759.00 – Powder Coated	Units are warranted for a period of one year from the date of delivery.	As needed







 = Green


# Design Elements - Newspaper Racks

Material/Design Element	Manufacturer & Description	Approximate Cost	Durability & Maintenance	Implementation Range
<b>Consolidated Rack</b> 	<p>Manufactured by Mechanism Exchange and Repair company. Manufactured from heavy 14 -20 gauge powder coated steel. Available in multiple combinations of units to accommodate both tabloid and broad sheet formats. Boxes can accommodate either paid and free newspapers. Available from 1 box to 6. Multiple units can be placed together.</p>	<p>Base prices start at \$1,800.00 for a 4-box unit and up to \$2,500.00 for a 6-box unit.</p>	<p>Extremely durable construction. Eliminates unsightly individual newspaper vending boxes. Anchored to sidewalk or sidewalk substrate.</p>	<p>Where needed. Lead time for construction is 6 to 12 weeks.</p>

 = Green

# Design Elements - Benches


Material/Design Element	Manufacturer & Description	Approximate Cost	Durability & Maintenance	Implementation Range
<b>Teak (Existing)</b> 	Manufactured from sustainably harvested Indonesian Teak. Heavy duty 3" legs and mortise and tenon joinery. Available in lengths from 4 feet to 12 feet.	\$800.00 – 6' w/back \$1,500.00 – 8' w/back Special pricing for longer lengths.	Benches are warranted for a 1 year period in commercial applications. Wood is easily cared for with seasonal applications of teak oil if desired.	As needed 
<b>Teak - Backless</b> 	Similar in style, appearance, and construction as the existing teak benches that line Nassau Street. Made from sustainably harvested Indonesian Teak.	\$525.00 – 6' Backless	Benches are warranted for a 1 year period in commercial applications. Wood is easily cared for with seasonal applications of teak oil if desired.	As needed 
<b>Firestone Walk Bench</b> 	Steel strap bench. ASTM 1080 cold rolled steel slats on ductile iron frame. Powder coated finish. Available from 4 feet to 8 feet.	\$1,050.00 – 6' Length	Benches are warranted for a 1 year period in commercial applications.	As needed
<b>Contemporary Steel</b> 	Manufactured from heavy rolled steel. Laser cut perforations. Metals include stainless steel or polyester powder coated. Available in numerous lengths.	\$1,230.00 – 6' Powder Coated	Benches are warranted for a 1 year period in commercial applications.	As needed

 = Green




# Design Elements

Material/Design Element	Manufacturer & Description	Approximate Cost	Durability & Maintenance	Implementation Range
LED Retrofit of Lamppost (Full cut-off)	Holophane- LED Lunar Leaf Acrylic Washington Postlite II LED 2 (AWDE2): AWDE2, LED Performance Package 30, 3000 Series CCT, Auto-Sensing Voltage (120-277V), Leaf Style - Standard, Black, Asymmetric Lunar Optic Type V, None, Painted Cast Aluminum Flower, Black, 0-10V Part-Night Dimming includes 120V tork button style photocontrol receptacle, Black	Unit starts at \$1,100.00 and up to \$3,000.00 depending on features, housing and color temperature.	Extremely durable construction.	Where needed. Lead time for construction is 6 to 12 weeks.
Surface Pavement Treatment	Pigmented Endurablend™ a durable colored surface treatment.	Varies depending on area of coverage and certified installer. Generally, less than 500 SF: \$15/SF; 500 to 2,000 SF: \$10 – \$15/SF; more than 2,000 SF: \$5 – \$10/SF.	5-20 years depending on surface and traffic volume	When Needed.
	Traffic Patterns XD	\$18/SF	5-20 years depending on surface and traffic volume	When Needed.
Traffic and Parking Related Signage	Speciallite - 4" diameter x 12' tall (bottom 2' buried to create 10' visual height) O/D fluted post finished with a black premium quality thermoset polyester powder coat for a durable finish. WRB11 decorative base, TSB203 sign frame, and TSB60 post topper to match finish of post.			As needed.

 = Green

# Design Elements

Material/Design Element	Manufacturer & Description	Approximate Cost	Durability & Maintenance	Implementation Range
Brasco Bayline Series Enhanced Shelter	Brasco Bayline series bus shelter with a living green roof and solar panels.	Approximately \$15,000.00.	Green Roof requires watering depending on climatic conditions.	Subject to funding and ridership demand needed to justify the special enhancements.
NJ Transit Enhanced Fair Lawn Style Handi-hut Bus Shelter	Handi-Hut – Black Fair Lawn style bus shelter model provided by NJ TRANSIT and enhanced with the Princeton Logo located within the sides of the barrel roof and solar panels.	Approximately \$850.00 for enhancements; base shelter is provided by NJ Transit.	Municipality is responsible for maintenance of shelter as a requirement of NJ Transit providing bus shelter.	When Needed.
Multi-space parking pay station	T2Systems – UNIFI Parking Management Platform – Digital Luke II pay stations.	Subject to further study as pay station is part of a larger parking management software and platform.	Dependent on changes in technology and management software.	When Needed.

 = Green

# Existing View





# With Enhancements





# Existing View



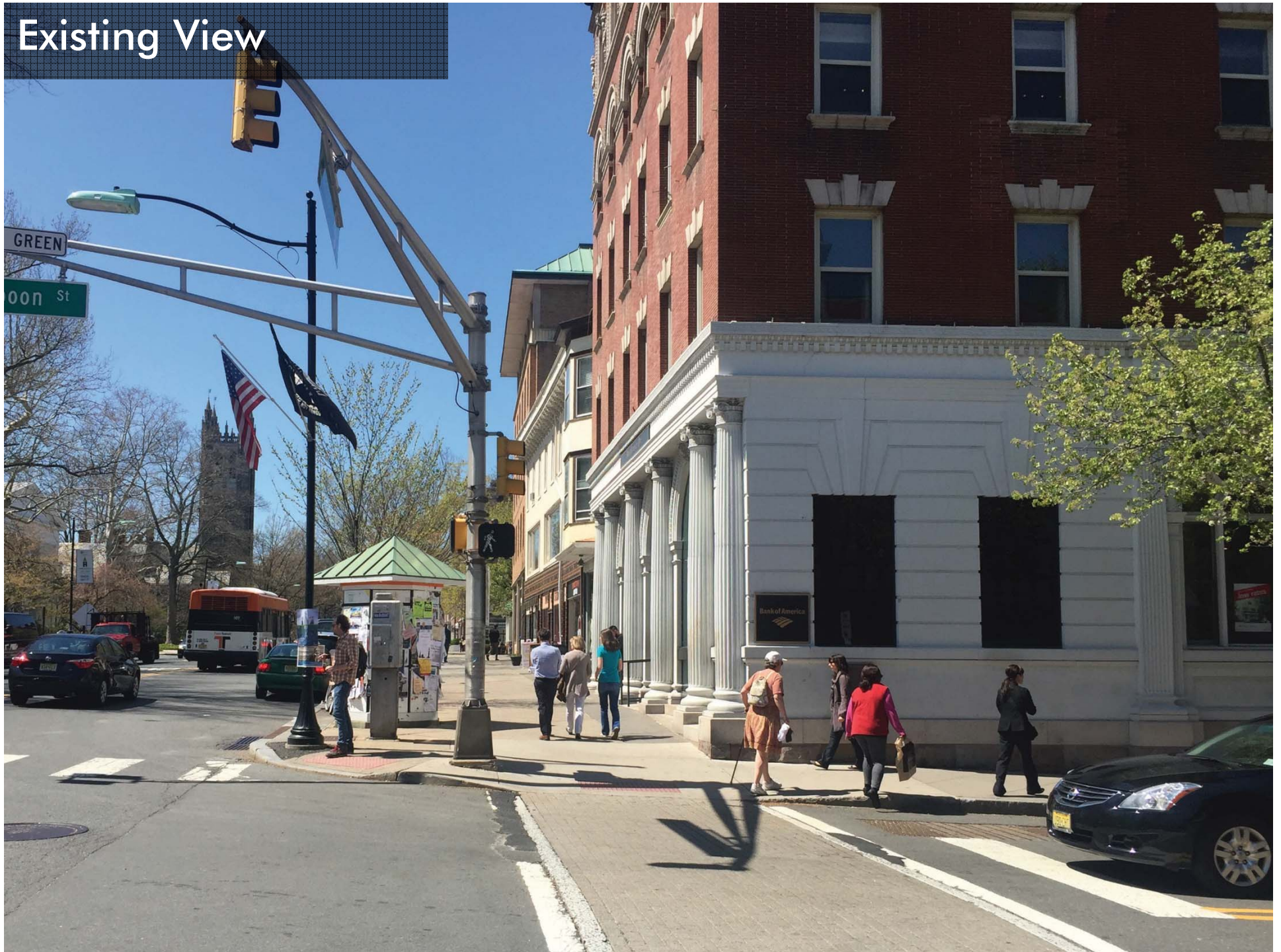


With Enhancements





# Existing View





With Enhancements





# Existing View





# With Enhancements





# Existing View





# With Enhancements





# Existing View





# With Enhancements

